PATENT ABSTRACTS OF JAPAN

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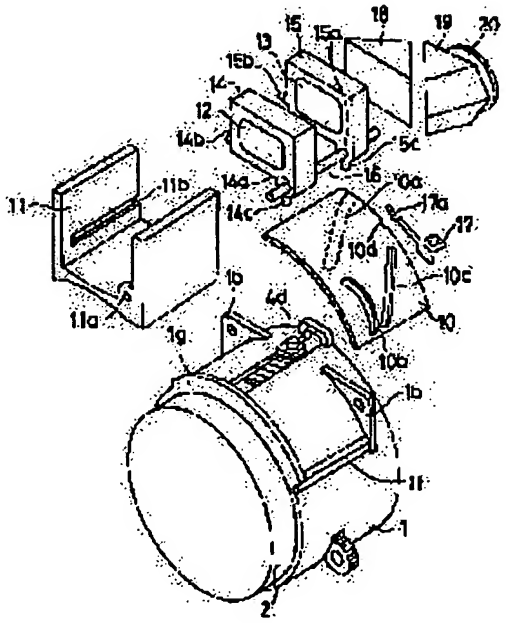
(54) CAMERA

(57)Abstract:
PROBLEM TO BE SOLVED: To reduce the number of components by unnecessitating a reduction gear itself and to miniaturize a camera by unnecessitating space for the reduction gear by directly driving a finder driving member by a lens barrel constituting member moving in an optical axis direction or the like in accordance with the position of a photographing lens.
SOLUTION: The lens barrel constituting member moving in accordance with the position of a photographing optical system is connected with the finder driving member 10 driving a finder optical system out of members constituting the lens barrel of a photographing optical system. A cam part 10a is formed at the finder driving member 10, and a cam pin 4d or the like provided at the lens barrel constituting member is engaged with the cam part 10a. In the case that the cam pin 4d or the like of the lens barrel constituting member is engaged with the cam part 10a of the finder driving member 10, the releasing of connection is performed by detaching the cam pin 4 or the like from the cam part 10a. A means 17 holding the finder driving member 10 replacing the lens barrel constituting member at the time of releasing the connection is provided.



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[Date of extinction of right]

* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] A camera characterized by connecting a lens-barrel configuration member which moves according to a location of a taking lens in a camera with which photography optical system and a finder light study system interlock among members which constitute a lens barrel of said photography optical system, and a finder driving member which drives said finder light study system.
[Claim 2] A camera according to claim 1 characterized by forming the cam section in said finder driving member, and said lens-barrel configuration member engaging with said cam section.
[Claim 3] It is the camera according to claim 1 or 2 characterized by canceling connection to said lens-barrel configuration member and said finder driving member when said taking lens is located in a successive range for un-taking a photograph.
[Claim 4] It is the camera according to claim 3 characterized by said lens-barrel configuration member seceding from said cam section when said taking lens is located in a successive range for un-taking a photograph.
[Claim 5] A camera according to claim 3 or 4 characterized by having a maintenance means to hold said finder driving member when said taking lens is located in a successive range for un-taking a photograph.
[Claim 6] A fixed cylinder by which said lens-barrel was fixed to a main part of a camera, and a tumbling barrel which moves in the direction of an optical axis while rotating by the circumference of an optical axis to this fixed cylinder, A camera given in either of claims 1-5 to which it has a rectilinear-propagation cylinder which moves in the direction of an optical axis, and consists of conditions of having been fixed to a hand of cut to said fixed cylinder, with said tumbling barrel, and said lens-barrel configuration member is characterized by being said rectilinear-propagation cylinder.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] This invention relates to the camera to which variable power actuation of a finder light study system is made to perform according to variable power actuation of photography optical system.
[0002]
[Description of the Prior Art] Drawing 4 shows the zoom lens lens-barrel accompanied by the conventional finder variable power device. The fixed scalpel helicoid cylinder 101 which had scalpel helicoid 101a in cylinder inner circumference, and had flange part 101b for immobilization in the periphery has hole 101c in the center of side abbreviation. Furthermore, in inner circumference, it has 101d of two or more key ways.
[0003] The male helicoid cylinder 102 with male helicoid 102a which carries out helicoid fitting with the fixed scalpel helicoid cylinder 101 has worm gear 102b in alignment with the helicoid lead. This worm gear 102b gears on the actuation gear 103 which projected inside the fixed scalpel HEIRIKOIDO cylinder 101 through hole 101c in the condition that the fixed scalpel helicoid cylinder 101 and the male helicoid cylinder 102 are carrying out helicoid fitting.
[0004] In the above configuration, if the actuation gear 103 rotates, it will let out the male helicoid cylinder 102 in the direction of an optical axis to the fixed scalpel helicoid cylinder 101, rotating. Moreover, it fits into the inner circumference of the male helicoid cylinder 102 pivotable with this, and the rectilinear-propagation cylinder 104 fixed so that it might not escape and come out in the direction of an optical axis is held in it. Two or more key 104a which carries out fitting sliding with 101d of key ways of the fixed scalpel helicoid cylinder 101 is formed in the edge of the rectilinear-propagation cylinder 104. Therefore, if it lets out to the fixed scalpel helicoid cylinder 101 while the male helicoid cylinder 102 rotates, it will let out the rectilinear-propagation cylinder 104 in the direction of an optical axis to the fixed scalpel helicoid cylinder 101, without rotating in [the male helicoid cylinder 102] one.
[0005] Furthermore, the lens frame 105,106,107 holding the lens group of a ****** graphic display, a shutter closing motion device, the lens delivery device for a focus, etc. is held in the inner circumference of the rectilinear-propagation cylinder 104. Two or more cam pins 105a, 106a, and 107a are attached in the periphery of each lens frame 105,106,107. These cam pins 105a, 106a, and 107a have fitted into slot 104b formed in the rectilinear-propagation cylinder 104 possible [sliding]. For this reason, each lens frame 105,106,107 is movable in the direction of an optical axis, without rotating to the rectilinear-propagation cylinder 104.
[0006] Moreover, each cam pins 105a, 106a, and 107a which penetrated slot 104b fit into the inner circumference of the male helicoid cylinder 102, and the cam groove (****** graphic display) to which it shows these so that optical conditions may be satisfied is formed in it with the revolution of the male helicoid cylinder 102.
[0007] In the above configuration, when the actuation gear 103 rotates, the male helicoid cylinder 102 and the rectilinear-propagation cylinder 104 let out to the fixed scalpel helicoid cylinder 101 in one, and the differential mold zoom lens-barrel which can further send out each lens frame 105,106,107 from there is constituted.
[0008] Next, the device in which this differential mold zoom lens-barrel is interlocked with, and variable power of a finder is performed is explained using drawing 5 . In this drawing, 101 is the scalpel helicoid cylinder mentioned above, and 103 is an actuation gear. The zoom motor 19 which drives this actuation gear 103 through the slowdown gear 120 is located in the center of the upper part of a zoom lens-barrel. Moreover, the objective lens group (113,114) of a finder is also located above a zoom lens-barrel.
[0009] With this configuration, if the zoom motor 119 rotates, a gear 120 will tell turning effort to the actuation gear 103, and a zoom lens-barrel will drive. On the other hand, driving force is transmitted also to gear section 118a of the cam board 118 which gears with a gear 120 through a gear 122,123, and the cam board 118 moves in the direction which intersects perpendicularly with an optical axis.
[0010] The guide slots 118d and 118e which extend in the direction which intersects perpendicularly with an optical axis are formed in the cam board 118, it could come to it, and the guide pins 112a and 112b of the finder cope plate 112 have fitted into the **** guide slots 118d and 118e. For this reason, migration is permitted only in the direction in which an optical axis and the cam board 18 cross at right angles.
[0011] Moreover, the finder guide bar 115 is inserted in hole 112c formed in the front end of the finder cope plate 112, and 1 group lens holder 113 and 2 group lens holder 114 are attached free [migration in the direction of an optical axis] on this guide bar 115.
[0012] The dowels 113b and 114b formed in 1 group lens holder 113 and 2 group lens holder 114 holding an objective lens 501,502 fit into guide slot 112e formed so that it might extend in the direction of an optical axis in these finder cope plates 112, and play the role of the niting of the circumference of the direction guide bar 115 of an optical axis for 1 group lens holder 113 and 2 group lens holder 114.
[0013] And when 1 group dowel 113a formed in 1 group cam-groove 18b of the cam board 118 and 2 group cam-groove 18c at lens holders 13 and 14, respectively and 2 group dowel 114a fit in and the cam board 118 moves, variable power actuation of a finder light study system is performed.

[0014]
[Problem(s) to be Solved by the Invention] However, if the configuration which interlocks variable power actuation of photography optical system and variable power actuation of a finder light study system through the slowdown gear 122,123 is taken as mentioned above, the part components mark which form the slowdown gear 122,123 increase, and it is necessary to also secure the these-arranged space. Moreover, in order to double the rate of variable power of a lens-barrel and a finder, it is necessary to carry out phase doubling of a gear, and it is assembly top trouble.
[0015] Furthermore, if photography optical system and a finder light study system are always connected, even in case photography optical system is made to collapse for storing, both finder light study systems need to move within a camera, and need to secure the space for it in a camera. Moreover, there is a possibility that photography optical system cannot collapse to near the film plane to the maximum extent. For this reason, there is a problem of leading to enlargement of a camera.
[0016] Then, the 1st object of the invention in this application does not need a interlocking member special between photography optical system and a finder light study system, but is to offer the camera which does not moreover have to carry out phase doubling like linkage by the gear.
[0017] Moreover, the 2nd object of the invention in this application is to offer the camera to which made it only indispensable migration make a finder perform to the motion from the wide edge of a taking lens to a collapsing position.
[0018]
[Means for Solving the Problem] In order to attain the above-mentioned object, in this application the 1st invention, a lens-barrel configuration member which moves according to a location of photography optical system among members which constitute a lens-barrel of photography optical system in a camera to which migration of photography optical system is interlocked with and a finder light study system is moved, and a finder driving member which drives a finder light study system are connected.
[0019] That is, components mark are decreased using the reduction gear for taking out an output of a motor like before itself as unnecessary, as a direct finder driving member is driven, and a space for reduction gears also enables it to miniaturize a camera as unnecessary by lens-barrel configuration member which moves in the direction of an optical axis etc. with variable power actuation of photography optical system. And a phase doubling activity of a reduction gear is done unnecessary, and it enables it to perform an assembly easily. When a lens-barrel has a fixed cylinder fixed to a main part of a camera, a tumbling barrel which moves in the direction of an optical axis while rotating by the circumference of an optical axis to this fixed cylinder, and a rectilinear-propagation cylinder which moves in the direction of an optical axis with a tumbling barrel in the condition were fixed to a hand of cut to a fixed cylinder and is constituted here, it is desirable to use a rectilinear-propagation cylinder as the above-mentioned lens-barrel configuration member.
[0020] And it is desirable to constitute so that a cam pin which formed the cam section in a finder driving member, and was specifically prepared in a lens-barrel configuration member may be made to engage with this cam section.
[0021] Moreover, in this application the 2nd invention, when photography optical system is located in a successive range for un-taking a photograph, connection to a lens-barrel configuration member and a finder driving member is made to be canceled.
[0022] Namely, when photography optical system is in a successive range for photography from a tele edge to a wide edge While a finder light study system moves in the direction of an optical axis to a main part of a camera with photography optical system By canceling the above-mentioned connection, when photography optical system separates from a successive range for photography (for example, range from a tele edge to a wide edge) and goes into a successive range for un-taking a photograph (collapsing range), and stopping a finder light study system Like [in case a finder light study system moves], in a main part of a camera, the need of securing a space is abolished and drawing requires a miniaturization of a camera even in a successive range for un-taking a photograph.
[0023] Concretely, when a cam pin of a lens-barrel configuration member etc. is engaging with the cam section of a finder driving member, it is desirable by making this cam pin etc. secede from this cam section for discharge of the above-mentioned connection to be made to be performed.
[0024] However, since there is a possibility that it may become impossible to recover the above-mentioned connection when connection to a finder driving member and a lens-barrel configuration member is canceled, a finder driving member moves by oscillation of a camera etc. and then photography optical system is moved to photographic coverage, it is desirable to establish a means to hold a finder driving member instead of a lens-barrel configuration member at the time of a deconcatenation (namely, when for photography optical system to be located in a successive range for un-taking a photograph).
[0025]
[Embodiment of the Invention]
(The 1st operation gestalt) Drawing 1 shows the zoom lens-barrel of the photography optical system of the camera which is the 1st operation gestalt of this invention. The fixed scalpel helicoid cylinder 1 which had scalpel helicoid 1a in cylinder inner circumference, and had flange part 1b for immobilization in the periphery has hole 1c in the center of side abbreviation. Furthermore, in inner circumference, it has 1d of two or more key ways.
[0026] In the male helicoid cylinder 2 with male helicoid 2a which carries out helicoid fitting with the fixed scalpel helicoid cylinder 1, it has worm gear 2b in alignment with the helicoid lead. This worm gear 2b gears on the actuation gear 3 which projected inside the fixed scalpel helicoid cylinder 1 through hole 1c in the condition that the fixed scalpel helicoid cylinder 1 and the male helicoid cylinder 2 are carrying out helicoid fitting.
[0027] By the above configuration, if the actuation gear 3 rotates, it will let out the male helicoid cylinder 2 in the direction of an optical axis to the fixed scalpel helicoid cylinder 1, rotating.
[0028] Moreover, it fits into the inner circumference of the male helicoid cylinder 2 pivotable with this, and the rectilinear-propagation cylinder 4 fixed so that it might not escape and come out in the direction of an optical axis is held in it. Two or more keys which carry out fitting sliding with 1d of key ways of the fixed scalpel helicoid cylinder 1 are formed in the edge of the rectilinear-propagation cylinder 4. Therefore, if it lets out to the fixed scalpel helicoid cylinder 1 while the male helicoid cylinder 2 is fixed, it will let out the rectilinear-propagation cylinder 4 in the direction of an optical axis to the fixed scalpel helicoid cylinder 1, without

rotating in [the male helicoid cylinder 2] one.

[0029] Furthermore, the lens frames 5, 6, and 7 holding the lens group of a ****** graphic display, a shutter closing motion device, the lens delivery device for a focus, etc. are held in the inner circumference of the rectilinear-propagation cylinder 4. Two or more cam pins 5a, 6a, and 7a are attached in the periphery of each lens frames 5, 6, and 7, and these cam pins 5a, 6a, and 7a have fitted into slot 4b formed in the rectilinear-propagation cylinder 4 possible [sliding]. For this reason, each lens frames 5, 6, and 7 are movable in the direction of an optical axis, without rotating to the rectilinear-propagation cylinder 4.

[0030] Moreover, each cam pins 5a, 6a, and 7a which penetrated slot 4b fit into the inner circumference of the male helicoid cylinder 2, and the cam groove (****** graphic display) to which it shows this so that optical conditions may be satisfied is formed in it with the revolution of the male helicoid cylinder 2.

[0031] In the above configuration, when the actuation gear 3 rotates, the male helicoid cylinder 2 and the rectilinear-propagation cylinder 4 let out to the fixed scalpel helicoid cylinder 1 in one, and the differential mold zoom lens-barrel which can further send out each lens frames 5, 6, and 7 from there is constituted.

[0032] Rest 4c is formed in the direction edge upside of an optical axis of the rectilinear-propagation cylinder 4, and 4d of cylinder-like pin sections is formed in the upper surface of this rest 4c. 4d of pin sections fits into slot 1e formed so that it might extend in the direction of an optical axis in the upper part of the scalpel helicoid cylinder 1, and they exercise this rest 4c before and behind the direction of an optical axis according to zoom actuation of a lens-barrel.

[0033] In addition, since the pin 4d location corresponds with the location of the lens frames 5, 6, and 7 holding a taking-lens county, it can know the focal distance of a taking lens by detecting a pin 4d location.

[0034] Next, variable power actuation of a taking lens is interlocked with using drawing 2 , and the finder light study system which carries out variable power actuation is explained. The finder cam board 10 is arranged in the upper part of the fixed scalpel helicoid cylinder 1 of a lens barrel, location regulation is carried out by the projected parts 1f and 1g formed in the direction of an optical axis by extending at the periphery of the fixed scalpel helicoid cylinder 1, and flange 1b formed in all peripheries, and this finder cam board 10 is movable only to a circumferencial direction.

[0035] Moreover, the finder cam board 10 is further pressed down by the finder cope plate 11 from the upper part. Holes 14a and 15a are formed in the objective lens frames 14 and 15 holding the finder objective lens counties 12 and 13, and the finder guide bar 16 has penetrated to these holes 14a and 15a. This finder guide bar 16 shows the finder objective lens counties 12 and 13 (lens frames 14 and 15) to hole 11a formed in the front end of the finder cope plate 11 before and behind the direction of an optical axis.

[0036] In addition, the dowel sections 14b and 15b formed in these objective lens frames 14 and 15 have fitted into slot 11b formed in the direction of an optical axis by extending at the finder cope plate 11 for the niting of the objective lens frames 14 and 15.

[0037] Moreover, 1st grooved cam 10a is formed in the background (side which counters the fixed scalpel helicoid cylinder 1) of the finder cam cope plate 10, and 4d of pin sections of the rectilinear-propagation cylinder 4 has fitted into this 1st grooved cam 10a.

[0038] Furthermore, the 2nd and 3rd grooved cams 10b and 10c are formed in the finder cam board 10, and the dowel sections 14c and 15c of the objective lens frames 14 and 15 have fitted into these 2nd and 3rd grooved cams 10b and 10c.

[0039] Here, it is shown in the form which developed each grooved cams 10a, 10b, and 10c of the finder cam board 10 to drawing 3 . Pin 4d, it separates from 1st grooved cam 10a at the time of storing collapsing of a lens-barrel (it is in the location shown by "**" of **** all over drawing). Moreover, at a wide edge, it enters all over drawing in 1st grooved cam 10a to the location shown by "W" of a round-head enclosure. At this time, each dowel sections 14c and 15c are in the location shown by "W" of a round-head enclosure all over drawing in 2nd and 3rd grooved cam 10b and 10c. Also at the time of collapsing, the dowel sections 14c and 15c are in the same location as wide end position.

[0040] If a taking lens lets out, pin 4d will move leftward in drawing 3 to Dowels 14c and 15c, and pin 4d and Dowels 14c and 15c will move the cam board 10 at a tele edge to the location shown by "T" of a round-head enclosure all over drawing to the cam board 10. For this reason, it shows around at each finder lens frame 14 and the 15 grooved cams 10b and 10c, and moves in the direction of an optical axis, respectively.

[0041] Since according to such a configuration 4d of pin sections which are performing linkage with the rectilinear-propagation cylinder 4 and the finder cam board 10 separates from cam board 10a at the time of collapsing, the cam board 10 becomes free to a circumferencial direction and this cam board 10 is fixed, the cam board fixed spring 17 is formed. Projected part 17a of the fixed spring 17 engages with 10d of V grooves of the cam board 10, and, specifically, holds a cam board in between [wide] from collapsing.

[0042] Thus, after the flux of light which passed the finder objective lens which carried out variable power actuation passes along the triangular prism 18, image formation of it is carried out between roof prisms 19. For this reason, a finder image can be seen through a roof prism 19 and an ocular 20.

[0043] In addition, the configuration of the finder driving member (finder cam board 10) in this invention and the lens-barrel configuration member (rectilinear-propagation cylinder 4) connected with this is not restricted to what was explained with the above-mentioned operation gestalt.

[0044] Moreover, this invention can be applied to cameras of various gestalten, such as a lens shutter camera and a video camera, and can be applied also to the element which constitutes further optical instruments other than a camera, other equipments, the equipment further applied to the equipment of these cameras, an optical instrument, or others, or these.

[0045] Moreover, the above operation gestalt and modification, or these technical element may be combined and used for this invention if needed.

[0046] (Relation between an operation gestalt and a claim) In the above-mentioned operation gestalt, the rectilinear-propagation cylinder 4 to the lens-barrel configuration member said to a claim The finder cam board 10 to the finder driving member said to a claim The fixed spring 17 is equivalent to the maintenance means said to a claim in the successive range for un-taking a photograph which the range from [near the wide location] to a collapsing position says to a claim at the cam section which 1st grooved cam 10a formed in the cam board 10 says to a claim, respectively.

[0047] In addition, although the above is tne response relation between each configuration of this invention, and each configuration of an operation gestalt, as long as this invention is the configuration that the function which the configuration of the device which it is not restricted to the configuration of these operation gestalt, and was shown in the claim, or an operation gestalt has can be attained, it may be what kind of thing.

[0048]

[Effect of the Invention] He is trying to drive a direct finder driving member in this application the 1st invention by the lens-barrel configuration member which moves in the direction of an optical axis etc. according to the location of a taking lens, as explained above. For this reason, if this invention is used, while being able to decrease components mark, being able to use the reduction gear for taking out the output of a motor like before itself as unnecessary, a camera can be miniaturized as the space for reduction gears being unnecessary. And since the activity with which the phase of a reduction gear is doubled like before for the alignment of the location of a taking lens and the location of a finder light study system becomes unnecessary, the assembly of a camera can be performed easily.

[0049] Moreover, when a taking lens is located in the successive range for un-taking a photograph, he is trying to cancel connection to a lens-barrel configuration member and a finder driving member in this application the 2nd invention. For this reason, a finder lens can be stopped, when using this invention, and a taking lens separates from photographic coverage and it goes into the successive range for un-taking a photograph (i.e., when there is no need of originally performing variable power actuation of a finder lens etc.). Therefore, the need of securing the migration space of a finder lens in case a taking lens is in the successive range for un-taking a photograph in the main part of a camera can be abolished, and the miniaturization of the part camera can be attained.

[0050] In addition, in the 2nd above-mentioned invention, if a maintenance means to hold a finder driving member instead of a lens-barrel configuration member is established when a taking lens is located in the successive range for un-taking a photograph, when a finder driving member moves by oscillation of a camera etc. and then a taking lens is moved to the successive range for photography, it can prevent certainly that it becomes impossible to recover the above-mentioned connection.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the perspective diagram of the zoom lens lens-barrel of the camera which is the 1st operation gestalt of this invention.
[Drawing 2] It is the perspective diagram showing the zoom lens lens-barrel and finder variable power device of the above-mentioned camera.
[Drawing 3] It is the development of the finder cam board of the above-mentioned camera.
[Drawing 4] It is the perspective diagram of the conventional zoom lens lens-barrel.
[Drawing 5] It is the perspective diagram of the conventional finder variable power device.
[Description of Notations]
1 Fixed Scalpel Helicoid Cylinder
2 Male Helicoid Cylinder
3 Actuation Gear
4 Rectilinear-Propagation Cylinder
5, 6, 7 Lens frame
10 Finder Cam Board
11 Finder Cope Plate
12 13 Objective lens group
14 15 Objective lens frame
16 Finder Guide Bar
17 Fixed Spring
18 Triangular Prism
19 Roof Prism
20 Ocular

[Translation done.]

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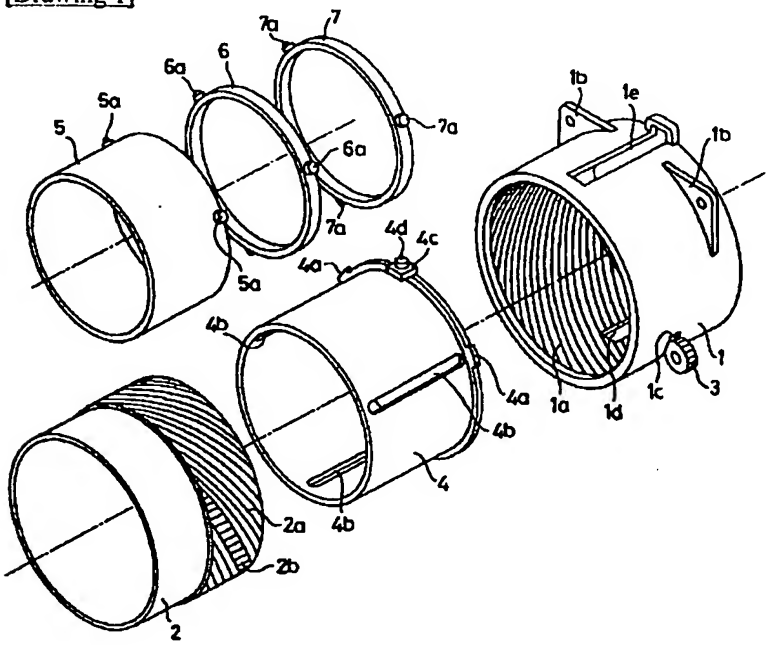
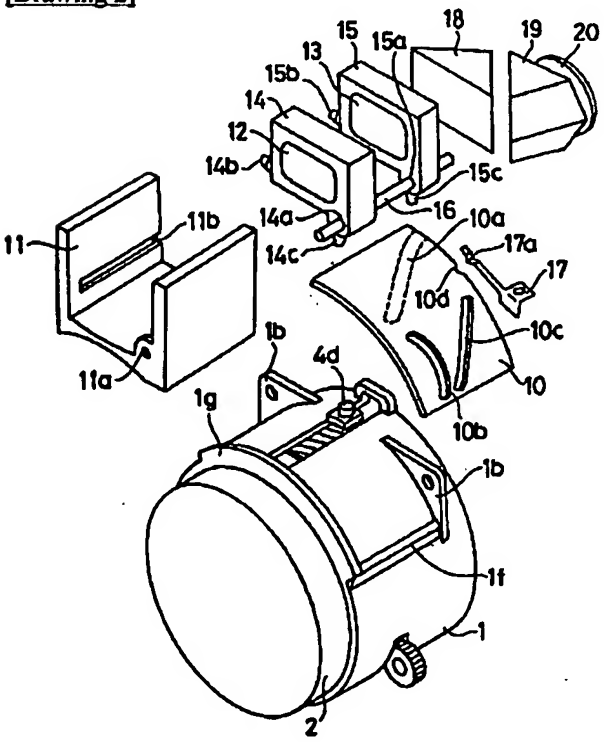
DRAWINGS

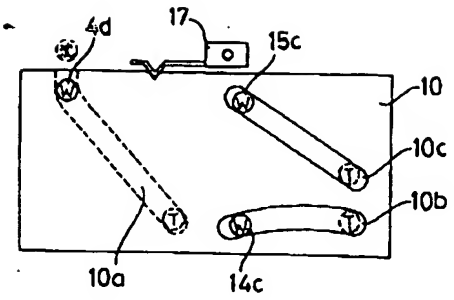
[Drawing 1]



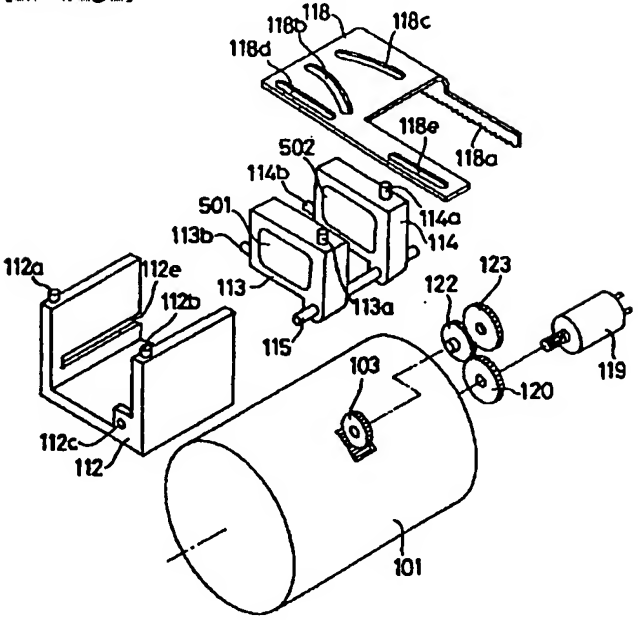
[Drawing 2]



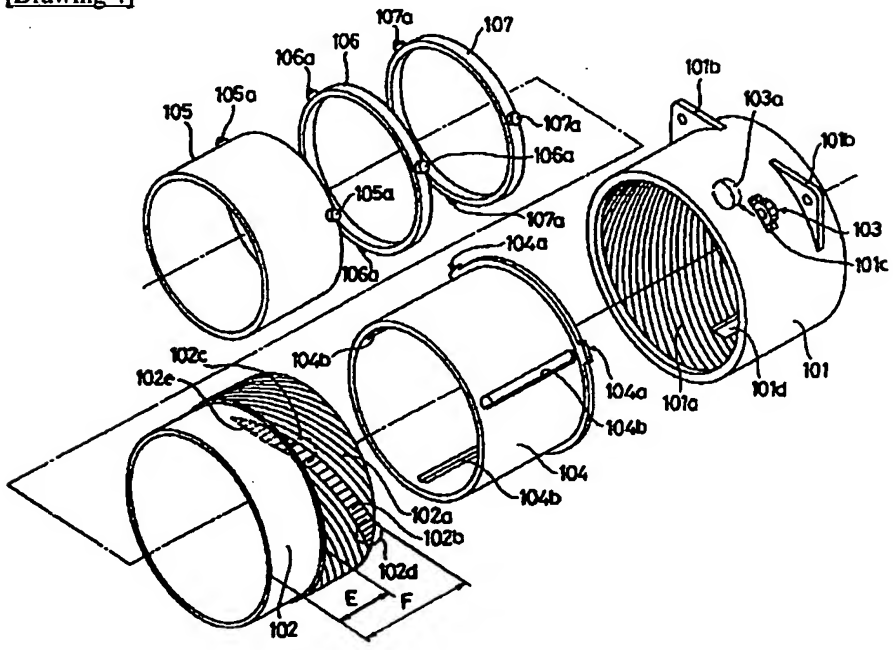
[Drawing 3]



[Drawing 5]



[Drawing 4]



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CORRECTION OR AMENDMENT

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[Procedure amendment]
[Filing Date] September 27, Heisei 13 (2001.9.27)
[Procedure amendment 1]
[Document to be Amended] Description
[Item(s) to be Amended] Claim 4
[Method of Amendment] Modification
[Proposed Amendment]
[Claim 4] It is the camera according to claim 2 characterized by said lens-barrel configuration member seceding from said cam section when said taking lens is located in a successive range for un-taking a photograph.
[Procedure amendment 2]
[Document to be Amended] Description
[Item(s) to be Amended] Claim 6
[Method of Amendment] Modification
[Proposed Amendment]
[Claim 6] Said lens barrel has a fixed cylinder fixed to a main part of a camera, a tumbling barrel which moves in the direction of an optical axis while rotating by the circumference of an optical axis to this fixed cylinder, and a rectilinear-propagation cylinder which moves in the direction of an optical axis with said tumbling barrel in the condition of having been fixed to a hand of cut to said fixed cylinder, and is constituted.
A camera given in either of claims 1-5 to which said lens-barrel configuration member is characterized by being said rectilinear-propagation cylinder.
[Procedure amendment 3]
[Document to be Amended] Description
[Item(s) to be Amended] 0035
[Method of Amendment] Modification
[Proposed Amendment]
[0033] In addition, since the pin 40 location corresponds with the location of the lens frames 5, 6, and 7 holding a taking-lens group, it can know the focal distance of a taking lens by detecting a pin 40 location.

[Translation done.]

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	7/04				7/10	C	
	7/10			Ｇ０３Ｂ	13/12		
Ｇ０３Ｂ	13/12			Ｇ０２Ｂ	7/04	E	

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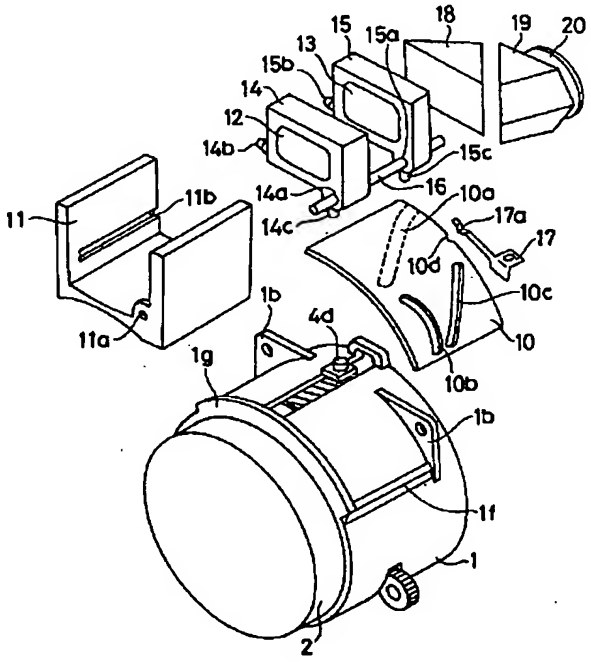
(54)【発明の名称】　カメラ

(57)【要約】

【課題】　撮影レンズとファインダーとをギヤを介して連動させると、部品点数が増加し、カメラも大型化する。

【解決手段】　撮影光学系とファインダー光学系１２，１３とが連動するカメラにおいて、撮影光学系のレンズ鏡筒を構成する部材のうち撮影レンズの位置に応じて移動する鏡筒構成部材１と、ファインダーレンズを駆動するファインダー駆動部材１０とを連結する。



【特許請求の範囲】
【請求項１】　撮影光学系とファインダー光学系とが連動するカメラにおいて、
前記撮影光学系のレンズ鏡筒を構成する部材のうち撮影レンズの位置に応じて移動する鏡筒構成部材と、
前記ファインダー光学系を駆動するファインダー駆動部材とを連結したことを特徴とするカメラ。
【請求項２】　前記ファインダー駆動部材にカム部が形成されており、
前記鏡筒構成部材が前記カム部に係合していることを特徴とする請求項１に記載のカメラ。
【請求項３】　前記撮影レンズが非撮影用移動範囲に位置しているときは、前記鏡筒構成部材と前記ファインダー駆動部材との連結が解除されることを特徴とする請求項１又は２に記載のカメラ。
【請求項４】　前記撮影レンズが非撮影用移動範囲に位置しているときは、前記鏡筒構成部材が前記カム部から離脱することを特徴とする請求項３に記載のカメラ。
【請求項５】　前記撮影レンズが非撮影用移動範囲に位置しているときに、前記ファインダー駆動部材を保持する保持手段を有することを特徴とする請求項３又は４に記載のカメラ。
【請求項６】　前記鏡筒が、カメラ本体に対して固定された固定筒と、この固定筒に対して光軸回りで回転しながら光軸方向に移動する回転筒と、前記固定筒に対して回転方向に固定された状態で前記回転筒とともに光軸方向に移動する直進筒とを有して構成されており、
前記鏡筒構成部材が、前記直進筒であることを特徴とする請求項１から５のいずれかに記載のカメラ。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、撮影光学系の変倍動作に応じてファインダー光学系の変倍動作を行わせるカメラに関するものである。
【０００２】
【従来の技術】図４は、従来のファインダー変倍機構を伴うズームレンズ鏡筒を示している。円筒内周にメスヘリコイド１０１ａを持ち、外周に固定用のフランジ部分１０１ｂを持った固定メスヘリコイド筒１０１は、その側面略中央に穴１０１ｃを有する。さらに、内周には複数本のキー溝１０１ｄを有する。
【０００３】固定メスヘリコイド筒１０１とヘリコイド嵌合するオスヘリコイド１０２ａを持ったオスヘリコイド筒１０２は、そのヘリコイド・リードに沿ったスパイラルギア１０２ｂを有する。このスパイラルギア１０２ｂは、固定メスヘリコイド筒１０１とオスヘリコイド筒１０２とがヘリコイド嵌合している状態では、穴１０１ｃを通して固定メスヘイリコイド筒１０１の内側に突出した駆動ギヤ１０３に噛合する。
【０００４】以上の構成において、駆動ギア１０３が回転すると、オスヘリコイド筒１０２は回転しながら固定メスヘリコイド筒１０１に対して光軸方向に繰り出す。また、オスヘリコイド筒１０２の内周には、これと回転可能に嵌合し、かつ光軸方向には抜け出ないように固定された直進筒１０４が収容される。直進筒１０４の端部には、固定メスヘリコイド筒１０１のキー溝１０１ｄと嵌合摺動する複数本のキー１０４ａが形成されている。従って、オスヘリコイド筒１０２が回転しながら固定メスヘリコイド筒１０１に対して繰り出すと、直進筒１０４は、オスヘリコイド筒１０２とは一体的に回転することなく固定メスヘリコイド筒１０１に対して光軸方向に繰り出す。
【０００５】さらに、直進筒１０４の内周には、図中不図示のレンズ群や、シャッター開閉機構、合焦用レンズ繰り出し機構等を保持するレンズ枠１０５，１０６，１０７が収容される。各レンズ枠１０５，１０６，１０７の外周には複数本のカムピン１０５ａ，１０６ａ，１０７ａが取り付けられている。これらカムピン１０５ａ，１０６ａ，１０７ａは、直進筒１０４に形成された長穴１０４ｂに摺動可能に嵌合している。このため、各レンズ枠１０５，１０６，１０７は直進筒１０４に対して回転することなく光軸方向に移動可能である。
【０００６】また、オスヘリコイド筒１０２の内周には、長穴１０４ｂを貫通した各カムピン１０５ａ，１０６ａ，１０７ａが嵌合して、オスヘリコイド筒１０２の回転に伴ってこれらを光学条件を満足するよう案内するカム溝（図中不図示）が形成されている。
【０００７】以上の構成において、駆動ギア１０３が回転すると、オスヘリコイド筒１０２と直進筒１０４とが一体的に固定メスヘリコイド筒１０１に対して繰り出し、さらに、そこから各レンズ枠１０５，１０６，１０７が繰り出し可能な差動型ズーム鏡筒が構成される。
【０００８】次に、この差動型ズーム鏡筒に連動してファインダーの変倍を行なう機構について図５を用いて説明をする。この図において、１０１は前述したメスヘリコイド筒で、１０３は駆動ギアである。この駆動ギア１０３を減速ギア１２０を介して駆動するズームモータ１９は、ズーム鏡筒の上方中央に位置している。また、ファインダーの対物レンズ群（１１３，１１４）もズーム鏡筒の上方に位置している。
【０００９】この構成では、ズームモータ１１９が回転するとギア１２０が駆動ギア１０３に回転力を伝えて、ズーム鏡筒が駆動される。一方、ギア１２２，１２３を介してギア１２０と噛み合うカム板１１８のギア部１１８ａにも駆動力が伝達され、カム板１１８が光軸に直交する方向に移動する。
【００１０】カム板１１８には、光軸に直交する方向に延びるガイド溝１１８ｄ，１１８ｅが形成されており、これえらガイド溝１１８ｄ，１１８ｅにはファインダー地板１１２のガイドピン１１２ａ，１１２ｂが嵌合して

いる。このため、カム板１８は光軸に直交する方向にのみ移動が許容される。

【００１１】また、ファインダー地板１１２の前端に形成された穴部１１２ｃにはファインダーガイドバー１１５が挿入され、このガイドバー１１５上には１群レンズホルダー１１３および２群レンズホルダー１１４が光軸方向に移動自在に取り付けられている。

【００１２】対物レンズ５０１，５０２を保持した１群レンズホルダ１１３および２群レンズホルダ１１４に形成されたダボ１１３ｂ，１１４ｂは、これらのファインダー地板１１２に光軸方向に延びるよう形成されたガイド溝１１２ｅに嵌合し、１群レンズホルダ１１３と２群レンズホルダ１１４を光軸方向ガイドバー１１５まわりの回転止めの役割を果たす。

【００１３】そして、カム板１１８の１群カム溝１８ｂおよび２群カム溝１８ｃに各々それぞれレンズホルダ１３，１４に形成された１群ダボ１１３ａ、２群ダボ１１４ａが嵌合し、カム板１１８が移動することにより、ファインダー光学系の変倍動作が行われる。

【００１４】

【発明が解決しようとする課題】しかしながら、上述したように、撮影光学系の変倍動作とファインダー光学系の変倍動作とを減速ギア１２２，１２３を介して連動させる構成を採ると、減速ギア１２２，１２３を設ける分部品点数が多くなり、これら配設するスペースも確保する必要がある。また、鏡筒とファインダーの変倍率を合わせるためにギアの位相合わせをする必要があり、組立て上面倒である。

【００１５】さらに、撮影光学系とファインダー光学系とを常時連結していると、撮影光学系を格納のために沈胴させる際までファインダー光学系がともにカメラ内で移動し、カメラ内にそのためのスペースを確保する必要がある。また、撮影光学系が最大限にフィルム面近傍まで沈胴できないおそれがある。このため、カメラの大型化につながるという問題がある。

【００１６】そこで、本願発明の第１の目的は、撮影光学系とファインダー光学系との間に特別な連動部材を必要とせず、しかもギアによる連動のように位相合わせをする必要がないカメラを提供することにある。

【００１７】また、本願発明の第２の目的は、撮影レンズのワイド端から沈胴位置までの動きに対し、ファインダーを最低限必要な移動のみ行わせるようにしたカメラを提供することにある。

【００１８】

【課題を解決するための手段】上記の目的を達成するために、本願第１の発明では、撮影光学系の移動に連動してファインダー光学系を移動させるカメラにおいて、撮影光学系の鏡筒を構成する部材のうち撮影光学系の位置に応じて移動する鏡筒構成部材と、ファインダー光学系を駆動するファインダー駆動部材とを連結している。

【００１９】すなわち、撮影光学系の変倍動作に伴って光軸方向等に移動する鏡筒構成部材によって直接ファインダー駆動部材を駆動するようにして、従来のようにモータの出力を取り出すための減速ギヤ自体を不要として部品点数を減少させ、減速ギヤ用のスペースも不要としてカメラを小型化できるようにしている。しかも、減速ギヤの位相合わせ作業を不要として、組立てを容易に行えるようにしている。ここで、鏡筒が、カメラ本体に対して固定された固定筒と、この固定筒に対して光軸回りで回転しながら光軸方向に移動する回転筒と、固定筒に対して回転方向に固定された状態で回転筒とともに光軸方向に移動する直進筒とを有して構成されている場合には、上記鏡筒構成部材として直進筒を用いるのが好ましい。

【００２０】そして、具体的には、ファインダー駆動部材にカム部を形成し、鏡筒構成部材に設けたカムピン等をこのカム部に係合させるよう構成するのが望ましい。

【００２１】また、本願第２の発明では、撮影光学系が非撮影用移動範囲に位置しているときは、鏡筒構成部材とファインダー駆動部材との連結が解除されるようにしている。

【００２２】すなわち、撮影光学系がテレ端からワイド端までの撮影用移動範囲にあるときは、撮影光学系とともにファインダー光学系がカメラ本体に対して光軸方向に移動する一方、撮影光学系が撮影用移動範囲（例えば、テレ端からワイド端までの範囲）から外れて非撮影用移動範囲（沈胴範囲）に入ったときには上記連結を解除し、ファインダー光学系を停止させることにより、非撮影用移動範囲でもファインダー光学系が移動する場合のようにカメラ本体内にスペースを確保する必要をなくし、カメラの小型化を図っている。

【００２３】具体的に、ファインダー駆動部材のカム部に鏡筒構成部材のカムピン等が係合している場合は、このカムピン等をこのカム部から離脱させることによって、上記連結の解除が行われるようにするのが望ましい。

【００２４】但し、ファインダー駆動部材と鏡筒構成部材との連結が解除されると、ファインダー駆動部材がカメラの振動等によって動いてしまい、次に撮影光学系を撮影範囲に移動させたときに上記連結を回復できなくなるおそれがあるので、連結解除時（すなわち、撮影光学系が非撮影用移動範囲に位置するとき）に鏡筒構成部材に代わってファインダー駆動部材を保持する手段を設けるのが望ましい。

【００２５】

【発明の実施の形態】

（第１実施形態）図１は本発明の第１実施形態であるカメラの撮影光学系のズーム鏡筒を示している。円筒内周にメスヘリコイド１ａを持ち、外周に固定用のフランジ部分１ｂを持った固定メスヘリコイド筒１は、その側面

略中央に穴１ｃを有する。さらに、内周には複数本のキー溝１ｄを有する。

【００２６】固定メスヘリコイド筒１とヘリコイド嵌合するオスヘリコイド２ａを持ったオスヘリコイド筒２には、そのヘリコイド・リードに沿ったスパイラルギア２ｂを有する。このスパイラルギア２ｂは、固定メスヘリコイド筒１とオスヘリコイド筒２とがヘリコイド嵌合している状態では、穴１ｃを通じて固定メスヘリコイド筒１の内側に突出した駆動ギヤ３に噛合する。

【００２７】以上の構成によって、駆動ギア３が回転すると、オスヘリコイド筒２は回転しながら固定メスヘリコイド筒１に対して光軸方向に繰り出す。

【００２８】また、オスヘリコイド筒２の内周には、これと回転可能に嵌合し、かつ光軸方向には抜け出ないように固定された直進筒４が収容される。直進筒４の端部には、固定メスヘリコイド筒１のキー溝１ｄと嵌合摺動する複数本のキーが形成されている。従って、オスヘリコイド筒２が固定しながら固定メスヘリコイド筒１に対して繰り出すと、直進筒４は、オスヘリコイド筒２とは一体的に回転することなく固定メスヘリコイド筒１に対して光軸方向に繰り出す。

【００２９】さらに、直進筒４の内周には、図中不図示のレンズ群や、シャッタ開閉機構、合焦用レンズ繰出し機構等を保持するレンズ枠５，６，７が収容される。各レンズ枠５，６，７の外周には、複数本のカムピン５ａ，６ａ，７ａが取付けられており、これらカムピン５ａ，６ａ，７ａは、直進筒４に形成された長穴４ｂに摺動可能に嵌合している。このため、各レンズ枠５，６，７は直進筒４に対して回転することなく光軸方向に移動可能である。

【００３０】また、オスヘリコイド筒２の内周には、長穴４ｂを貫通した各カムピン５ａ，６ａ，７ａが嵌合し、オスヘリコイド筒２の回転に伴ってこれを光学条件を満足するよう案内するカム溝（図中不図示）が形成されている。

【００３１】以上の構成において、駆動ギア３が回転すると、オスヘリコイド筒２と直進筒４とが一体的に固定メスヘリコイド筒１に対して繰り出し、さらに、そこから各レンズ枠５，６，７が繰り出し可能な差動型ズーム鏡筒が構成される。

【００３２】直進筒４の光軸方向端部上側には、台部４ｃが形成されており、この台部４ｃの上面には円柱状のピン部４ｄが形成されている。この台部４ｃをピン部４ｄはメスヘリコイド筒１の上部に光軸方向に延びるよう形成された溝部１ｅに嵌合し、鏡筒のズーム動作に応じて光軸方向前後に運動する。

【００３３】なお、ピン４ｄの位置は、撮影レンズ郡を保持するレンズ枠５，６，７の位置と対応しているので、ピン４ｄの位置を検出することによって撮影レンズの焦点距離を知ることができる。

【００３４】次に、図２を用いて撮影レンズの変倍動作に連動して変倍動作するファインダー光学系について説明する。レンズ鏡筒の固定メスヘリコイド筒１の上部には、ファインダーカム板１０が配設されており、このファインダーカム板１０は、固定メスヘリコイド筒１の外周に光軸方向に延びて形成された突部１ｆ，１ｇと外周全部に形成されたフランジ部１ｂとによって位置規制されて、円周方向にのみ移動可能となっている。

【００３５】また、ファインダーカム板１０は更に上部からファインダー地板１１により押さえられている。ファインダー対物レンズ郡１２，１３を保持している対物レンズ枠１４，１５には穴部１４ａ，１５ａが形成されており、これら穴部１４ａ，１５ａにはファインダーガイドバー１６が貫通している。このファインダーガイドバー１６は、ファインダー地板１１の前端に形成された穴部１１ａにファインダー対物レンズ郡１２，１３（レンズ枠１４，１５）を光軸方向前後に案内する。

【００３６】なお、対物レンズ枠１４，１５の回転止めのため、これら対物レンズ枠１４，１５に形成されたダボ部１４ｂ，１５ｂが、ファインダー地板１１に光軸方向に延びて形成された溝部１１ｂに嵌合している。

【００３７】また、ファインダーカム地板１０の裏側（固定メスヘリコイド筒１に対向する側）には、第１溝カム１０ａが形成されており、この第１溝カム１０ａには直進筒４のピン部４ｄが嵌合している。

【００３８】さらに、ファインダーカム板１０には、第２および第３溝カム１０ｂ，１０ｃが形成されており、これら第２および第３溝カム１０ｂ，１０ｃには対物レンズ枠１４，１５のダボ部１４ｃ，１５ｃが嵌合している。

【００３９】ここで、図３にファインダーカム板１０の各溝カム１０ａ，１０ｂ，１０ｃを展開した形で示す。ピン４ｄは、鏡筒の格納沈胴時は第１溝カム１０ａから外れる（図中に丸囲の「沈」で示す位置にある）。また、ワイド端では、第１溝カム１０ａにおける図中に丸囲みの「Ｗ」で示す位置まで入る。この時各ダボ部１４ｃ，１５ｃは、第２および第３溝カム１０ｂ，１０ｃ内における図中に丸囲みの「Ｗ」で示す位置にある。沈胴時も、ダボ部１４ｃ，１５ｃはワイド端位置と同じ位置にある。

【００４０】撮影レンズが繰り出されると、カム板１０はピン４ｄがダボ１４ｃ，１５ｃに対して図３中左方向に移動し、テレ端ではピン４ｄやダボ１４ｃ，１５ｃはカム板１０に対して図中にて丸囲みの「Ｔ」で示す位置まで移動する。このため各ファインダーレンズ枠１４，１５溝カム１０ｂ，１０ｃに案内されてそれぞれ光軸方向に移動する。

【００４１】このような構成によれば、沈胴時は直進筒４とファインダーカム板１０との連動を行なっているピン部４ｄが、カム板１０ａからはずれ、カム板１０が円

周方向に対してフリーになるので、このカム板１０を固定するために、カム板固定バネ１７が設けられている。具体的には、固定バネ１７の突部１７ａがカム板１０のＶ溝１０ｄに係合して、沈胴からワイドの間でカム板を保持する。

【００４２】このように変倍動作したファインダー対物レンズを通過した光束は、三角プリズム１８を通った後、ダハプリズム１９との間で結像される。このためダハプリズム１９と接眼レンズ２０とを通してファインダー像を見ることができる。

【００４３】なお、本発明におけるファインダー駆動部材（ファインダーカム板１０）や、これに連結される鏡筒構成部材（直進筒４）の形状は、上記実施形態にて説明したものに限られるものではない。

【００４４】また、本発明は、レンズシャッタカメラ、ビデオカメラ等、種々の形態のカメラに適用することができ、さらにはカメラ以外の光学機器やその他の装置、さらにはそれらカメラや光学機器やその他の装置に適用される装置またはこれらを構成する要素に対しても適用することができる。

【００４５】また、本発明は、以上の実施形態および変形例、またはそれら技術要素を必要に応じて組み合わせて用いてもよい。

【００４６】（実施形態と請求の範囲との関係）上記実施形態において、直進筒４が請求の範囲にいう鏡筒構成部材に、ファインダーカム板１０が請求の範囲にいうファインダー駆動部材に、カム板１０に形成された第１溝カム１０ａが請求の範囲にいうカム部に、ワイド位置近傍から沈胴位置までの範囲が請求の範囲にいう非撮影用移動範囲に、固定バネ１７が請求の範囲にいう保持手段にそれぞれ相当する。

【００４７】なお、以上が本発明の各構成と実施形態の各構成の対応関係であるが、本発明はこれら実施形態の構成に限られるものではなく、請求項に示した機構または実施形態の構成が持つ機能が達成できる構成であればどのようなものであってもよい。

【００４８】

【発明の効果】以上説明したように、本願第１の発明では、撮影レンズの位置に応じて光軸方向等に移動する鏡筒構成部材によって直接ファインダー駆動部材を駆動するようにしている。このため、本発明を用いれば、従来のようにモータの出力を取り出すための減速ギヤ自体を不要として部品点数を減少させることができるとともに、減速ギヤ用のスペースも不要としてカメラを小型化することができる。しかも、従来のように撮影レンズの位置とファインダー光学系の位置との位置合わせのために減速ギヤの位相を合わせる作業が不要となるため、カメラの組立てを容易に行うことができる。

【００４９】また、本願第２の発明では、撮影レンズが非撮影用移動範囲に位置するときには、鏡筒構成部材とファインダー駆動部材との連結を解除するようにしている。このため、本発明を用いれば、撮影レンズが撮影範囲から外れて非撮影用移動範囲に入ったとき、すなわち本来ファインダーレンズの変倍動作等を行う必要のないときにファインダーレンズを停止させることができる。したがって、撮影レンズが非撮影用移動範囲にあるときのファインダーレンズの移動スペースをカメラ本体内に確保する必要をなくすることができ、その分カメラの小型化を図ることができる。

【００５０】なお、上記第２の発明において、撮影レンズが非撮影用移動範囲に位置するときに、鏡筒構成部材に代わってファインダー駆動部材を保持する保持手段を設ければ、ファインダー駆動部材がカメラの振動等によって動いてしまい、次に撮影レンズを撮影用移動範囲に移動させたときに上記連結を回復できなくなるのを確実に防止することができる。

【図面の簡単な説明】

【図１】本発明の第１実施形態であるカメラのズームレンズ鏡筒の斜視図である。

【図２】上記カメラのズームレンズ鏡筒とファインダー変倍機構とを示す斜視図である。

【図３】上記カメラのファインダーカム板の展開図である。

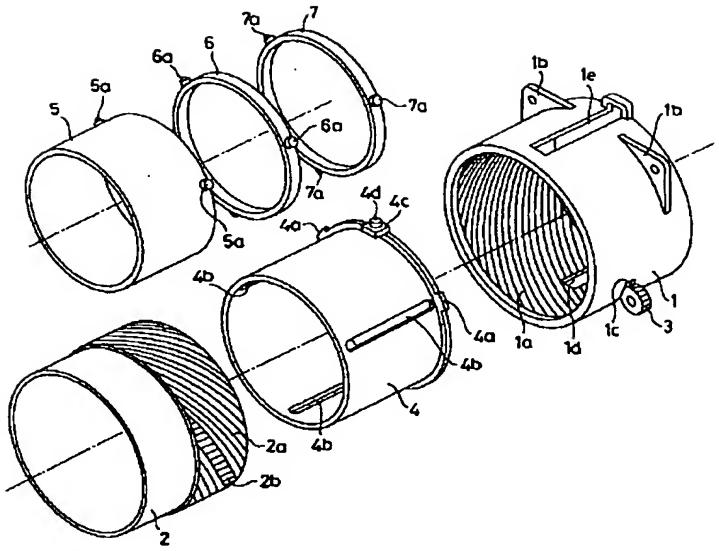
【図４】従来のズームレンズ鏡筒の斜視図である。

【図５】従来のファインダー変倍機構の斜視図である。

【符号の説明】

１　固定メスヘリコイド筒
２　オスヘリコイド筒
３　駆動ギア
４　直進筒
５，６，７　レンズ枠
１０　ファインダーカム板
１１　ファインダー地板
１２，１３　対物レンズ群
１４，１５　対物レンズ枠
１６　ファインダーガイドバー
１７　固定バネ
１８　三角プリズム
１９　ダハプリズム
２０　接眼レンズ

【図1】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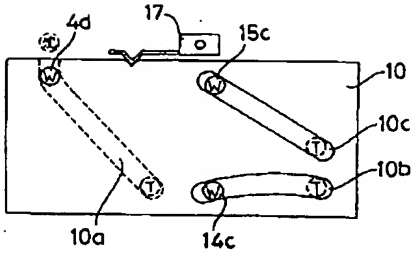
6
5a
5
7a
6a
7a
4d
4c
4a
5a
4b
1b
1e
1b
1a
1d
1c
1
3
4a
4b
4
2a
4b
2b
2

【図3】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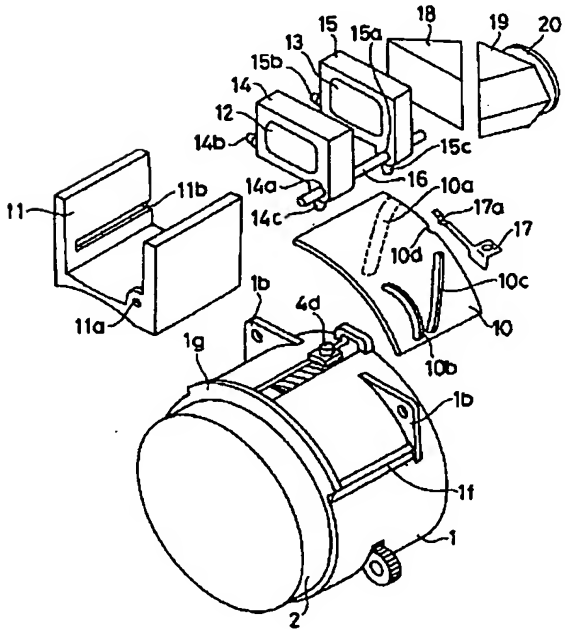
15c
10
10c
10b
10a
14c

【図2】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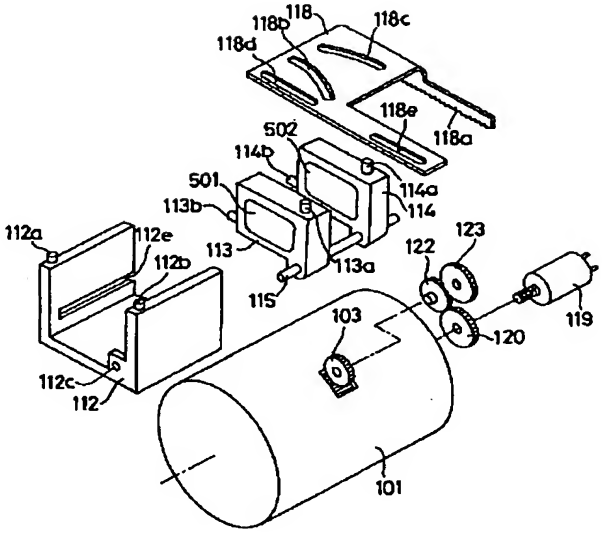
13
15b
14
12
14b
15c
16
10a
14a
14c
17a
17
10d
11
11b
10c
10
11a
1b
4d
1g
10b
1b
11
1
2

【図5】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118a
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501
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113b
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112a
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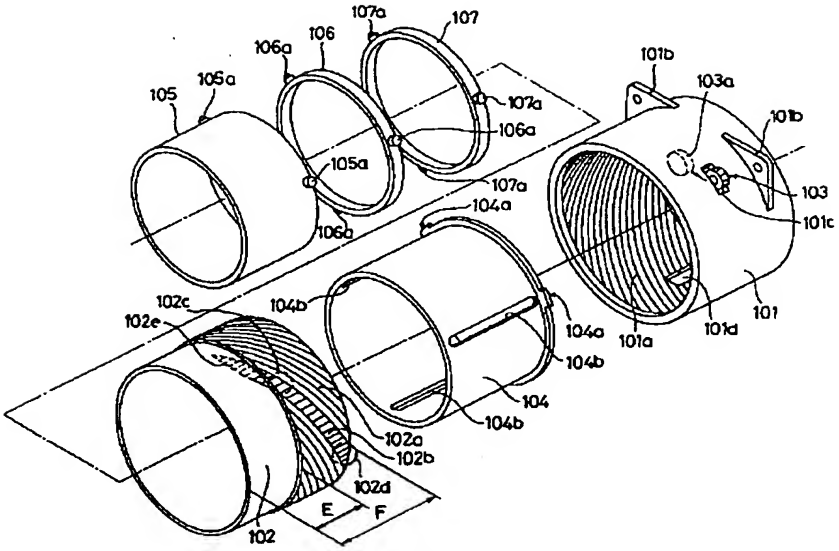
123
122
113
112b
113a
115
119
103
120
112c
112
101

【図4】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104
104b
102a
102b
102d
E
F
102
101b
103a
101b
103
101c
101
101d
101a